A Picture of the Fruit and Vegetable Industry

BY CHARLES J. BRAND

MARKETING FRUITS AND VEGETABLES
LESSON 1

Confidential Edition
Issued for Members

The American Institute of Agriculture
CHICAGO

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BY CHARLES J. BRAND

Formerly Vice-President and General Manager of the American Fruit Growers, Incorporated

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"Every Lesson by a National Authority"

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THE AMERICAN INSTITUTE OF AGRICULTURE
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THE MAN WHO CONDUCTS THIS LESSON

CHARLES J. BRAND

There are few men who understand the fruit and vegetable industry from the combined viewpoint of the practical business man and the student as thoroughly as Mr. Brand.

Mr. Brand was chosen as the first chief of the Federal Bureau of Markets when it was established in 1913, and he guided that organization through the first stages of its work, until 1918. When he became general manager of the American Fruit Growers, Inc., the Bureau had become one of the most helpful in the Department of Agriculture. Some of his most constructive work was done in connection with the fruit and vegetable industry, and Mr. Brand came into close touch with all of the leaders in the field.

In recognition of Mr. Brand's familiarity with the fruit industry of the nation, he was appointed vice-president and general manager of the national sales organization known as American Fruit Growers' Inc. This organization, with its own orchard and truck acreages in all sections of the country, in-

cluding all of the major fruit and vegetable crops, needed a man as manager who knew not one crop or one section, but who understood the industry in all of its interrelations and from a national viewpoint.

Mr. Brand's combined experience as a government official and as a major executive in one of the largest marketing organizations in the country, fits him to write on the subject of this lesson as few men are qualified to do.

HOW TO STUDY THIS LESSON

There are 29 principal fruits and vegetables, and each one has certain pecularities of its own and special marketing methods have been developed because of these peculiarities.

Most fruits and vegetables are produced during a very short season. They are highly perishable, and so must be handled promptly and with great care. These difficulties make the marketing of fruits and vegetables much more interesting, and any man who likes to do hard things finds in the marketing of fruits and vegetables unusual delight, because there is always extreme satisfaction in accomplishing anything that has uncommon complications.

Treatment Carefully Systematized

The complexity of the marketing machinery for fruits and vegetables is systematized and clarified in the lessons you are to have from now on. And it is not likely that any student will feel that marketing fruits and vegetables is any more difficult than marketing other products after he has mastered a few of the first lessons in this course.

The principal variation from studying the marketing of other products is illustrated in this lesson. The difference is that the products must be studied separately, and in this lesson, which is unusually long, you will find that the text has been divided into two principal parts, with 14 sections. This division makes it easy to study and easy to comprehend. In order to help you in your study, this lesson has been divided into five assignments, each one of which must be studied separately and must be mastered before you pass on to the next assignment. These five assignments are as follows:

ASSIGNMENTS

1. Master Part I, Sections 1 and 2—The Industry As a Whole—and the Apple Crop.

2. Master Part 1, Sections 3, 4, 5, and 6—Citrus Fruits, Grapes, Peaches, and Strawberries.

3. Master Part II, Sections 1 and 2—The Vegetable Crops—Potatoes.

4. Master Part II, Sections 3, 4, and 5—Tomatoes, Onions, and Cabbage.

5. Master Part II, Sections 6, 7, and 8—Melons, Future Development, Publicity.

Know the Industry as a Whole

The two parts of the lesson divide the study of fruits from the study of vegetables. And in Section 1 of Part I, you are given a good idea of the industry as a whole, including both fruits and vegetables. It is extremely important that you master Section 1 thoroughly.

While you are not expected to memorize Table I, it is an important table for you to study. There you get a concise idea of the comparative importance of the different fruit and vegetable crops. You certainly ought to remember the standing of the first five crops, and it would be still better if you would remember the standing of the first 10.

Remember, however, that this table is based on the number of carloads, rather than on the value in dollars. There would be a little difference in the order if value were given instead of carloads. For example, bulky watermelons could not retain their position if the rank were based on value instead of on carloads.

Figure 1 will help you to familiarize yourself with the fruit-growing territories. When you study this map, together with the reading matter in the lesson that describes it, you will have a much better idea of the real fruit territory. The high specialization so common in American agriculture is particularly emphasized in the production of fruits.

California is the one big state in the production of both fruits and vegetables, and it has such a big lead over other states that it is likely to remain the leader for some time.

How to Study Statistics

Keep in mind always in studying statistics, that conditions change constantly and where the rank of two states is rather close, that rank is

likely to change, even from year to year. It is important, however, to have the principal fruit-growing states in mind, especially the first 10.

In studying both Table I and Table II, you will find paper and pencil most helpful. One of the best ways to realize the importance of figures contained in tables and to get these figures firmly fixed in your mind, is to copy the table onto another sheet of paper, arranging it in a little different way, if possible. The copying of the figures fixes the situation in your mind much better than simply reading them.

As an example of the way of arranging the tables differently, let us consider Table II. You might make a row of columns along the top of a sheet of paper, containing the names of the fruits instead of the years, placing the years along the left-hand side. If you do this, you will have emphasized to you that the order of rank of the different fruits is different for the different years. For example, oranges and peaches will change places for the years 1919 and 1920. The rank in Table II is based on the 1921 value.

Another way to vary the table is to enter only the figures indicating thousands of dollars. In other words, omit the last three numerals. Still another way is to enter the figures in millions of dollars; instead of writing $241,574,000, you might enter 242. It is easier to compare 242 with 83, 95 and other figures, than it is to compare the total numbers. It has been felt important, however, in some cases to give complete numbers so you might have them for reference.

Don't Divide Your Attention

It is suggested in your assignments, that you consider Section 2 on the apple crop, together with Section 1, which covers the industry as a whole. However, this does not mean that you are to study the two sections together. It is better to master Section 1 first, and then consider Section 2 by itself, remembering, however, what you learned in Section 1. In Section 2, concentrate your mind on apples, and when you feel that you have mastered that subject, then answer the questions that are provided for assignment 1.

After answering these questions, you will, of course, proceed to assignment 2. And your method of study there will be similar to that used in completing assignment 1. The principal point to remember is to concentrate your mind on the citrus crop until you have thorughly mastered what is given on that subject. You will, of course, refer to the discussion of the apple crop and make certain comparisons. But imagine yourself, if you can, a grower of oranges, and study Section 3 from the standpoint of an orange grower.

The same suggestion applies to Section 4; that is, imagine yourself a grower of grapes. Having mastered Sections 3 and 4, then study Section 5 from the viewpoint of a peach grower.

Your Foundation Knowledge is Here

Do not be confused by the fact that not all of the methods used in marketing these individual crops are discussed in these various sections. It would be impossible to give a complete discussion all in one lesson. The rest of the lessons in this course will complete your knowledge, because the individual crops will be referred to frequently as you proceed.

The method of following assignment 3 is very similar to that suggested for assignment 1. You must first have your general information on the vegetable crop as a whole. And then you must concentrate your mind on one crop at a time, until you have mastered that. The potato crop, being the largest and so the most important of all vegetable crops, is given more space than is devoted to others. This should be significant to you and should encourage you to be sure that you have thoroughly mastered this section before going farther. The questions, of course, are to be answered for each assignment before you proceed to the next one.

You May Get New Conceptions

The principal suggestion that will help you in studying assignment 4, is that the tomato crop is far more important than most folks realize. Possibly because of its extreme perishability, the tomato has been considered by those who are not familiar with its marketing, to be a comparatively small crop. But in this lesson you will learn differently. And as you proceed with other lessons,

you will realize the unusual importance of the tomato crop even more.

The marketing of onions and cabbage has a certain similarity. In many cases, the same market men handle both crops. It is quite common that where cabbage is grown, onions are grown also, and the same storehouse is often used for both cabbage and onions. This applies, of course, to the late varieties which are stored for winter use.

After answering the questions for assignment 4, proceed to assignment 5, and concentrate your mind first on the melon crop. You may be surprised at the immense size of the watermelon crop. Most folks have realized the growing popularity of cantaloupes, but not so many, perhaps, have understood that the watermelon crop is also large and popular.

Sections 7 and 8, of course, apply to all fruits and vegetables, and you should study these sections with the same interest that you studied Section 1 in Part I. Because of the fact that conditions are constantly changing and market methods are varied from week to week, it is important that you know what the future is likely to be and what it is that is likely to influence the change of methods.

While it is not expected that you will spend five weeks on these five assignments, it is urged that you hold yourself back and not be too eager to finish these five assignments because they are all in one lesson. You should spend at least two weeks (or 12 hours) in a study of this lesson.

STUDY OUTLINE

A PICTURE OF THE FRUIT AND VEGETABLE INDUSTRY

BY CHARLES J. BRAND

If you are to get the most out of your study on the marketing of fruits and vegetables, you must realize the important place this industry holds in the agriculture of our nation. Understanding as you do, from your study of previous lessons, that the United States leads the world in agriculture, you will be even more impressed with the importance of the fruit and vegetable industry.

Although 1919 figures show that fruits and vegetables stand in fourth place among the agricultural industries of our nation, it is only fair to say that from the standpoint of agricultural commerce, fruits and vegetables stand third rather than fourth. This is justified by the fact that hay and forage crops which hold second place in total values, do not enter into commerce enough to give them that place from the standpoint of marketing.

Only cereals and cotton, therefore, are entitled to be classed ahead of fruits and vegetables, and cotton does not have a very big lead over fruits and vegetables. It is entirely probable, therefore, that in certain years, when the cotton crop is small, the fruit and vegetable crop might be large, and so move into second place.—Editor's Note.

PART I

Section 1. THE INDUSTRY AS A WHOLE

Keep in mind the title of this lesson as you study. This is a picture of the industry as a whole and it is most important for you to have the facts contained herein.

The relative importance of fruits and vegetables will be better understood when you realize

that the total commercial vegetable crop has almost twice the value of the total commercial fruit crop. As a matter of fact, the value of potatoes just about equals the total value of all fruits. This is all based on 1919 figures.

Why Part of the Crop Is Not Marketed

It has been estimated that not more than 50% of the fruits and vegetables produced ever reach a market. This is due to several causes, among which may be mentioned:

1. Consumption on farms
2. Disease
3. Unfavorable weather conditions
4. Scarcity of pickers when the crop is ripe
5. Difficulty in securing proper equipment, especially where refrigerator cars are required in large numbers
6. Spoilage in transit because of the extremely perishable nature of many fruits and vegetables
7. Over-ripe fruit
8. Improper icing

Every additional handling increases the danger of spoilage through bruising. It is little wonder, then, that such a small portion of the total production ever reaches market.

The Extent of the Commercial Industry

It is difficult to ascertain an accurate total of fruits and vegetables which actually enter commercial channels. Probably the closest estimate that has ever been made is a tabulation made by the Federal Bureau of Markets in 1916. This included all of the car-lot shipments of fruits and vegetables made in that year with the less than car-lot (l.c.l.) and express shipments converted into even cars.

The information was secured from the individual railroad station agents of the United States, about 25,000 in number. Naturally, there are some inaccuracies to be expected in the figures and it is very likely that the actual total number of cars exceeds

the number tabulated by the government. The records show a total of 634,145 cars of fruits and vegetables shipped in the year 1916. These are divided as shown in Table I.

Wide Variety Grown Commercially

This list is of importance mainly because it shows the wide variety of fruits and vegetables produced on a commercial scale in this country. All the important kinds of fruits and vegetables are represented in this summary, but their comparative commercial importance is more accurately indicated in Table II and Table VI. These tables give the rank of crops as based on value.

Table I is important mainly because it shows the comparative transportation problem. For example, watermelons stand second to Irish potatoes in bulk, but in value, watermelons stand in 10th place. This emphasizes the importance of a proper adjustment of freight rates taking into account not only bulk and weight, but value. This was brought home to farmers by the post-war rate changes.

This table also emphasizes the relative importance of car supply during the shipping seasons. Car shortage may be more serious in the movement of a bulky commodity than of a commodity of less bulk but greater unit value.

Irish Potatoes Far in the Lead

Irish potatoes are far in the lead with nearly 192,000 cars; over twice as many as the nearest competitor, apples, with 87,251 cars. Then follow oranges, watermelons, peaches, cabbages, and onions. All other commodities are credited in this table with less than 20,000 cars.

It may be a surprise to many to know that over 16,000 cars of bananas and over 10,000 cars of celery were shipped commercially in the United States in 1916. Other equally surprising facts may be gained from a careful study of Table I.

Table I. ORDER OF RANK OF FRUITS AND VEGETABLES SHIPPED IN 1916

(Based on car-lot shipments)

Kind	Number of Cars	Kind	Number of Cars
Irish potatoes	191,751	Pears	7,489
Apples	87,251	Lemons	7,482
Oranges	50,134	Mixed Vegetables	6,210
Watermelons	28,939	Lettuce	4,700
Peaches	25,026	Dry beans	4,020
Cabbage	24,505	Cucumbers	3,522
Onions	22,043	Cauliflower	2,872
Mixed fruits	19,367	Raisins	2,860
Tomatoes	19,323	String beans	2,706
Strawberries	18,044	Spinach	2,653
Cantaloupes	17,321	Kale	2,579
Bananas	16,301	Grapefruit	2,327
Sweet potatoes	15,695	Cranberries	1,790
Grapes	12,062	Pineapples	1,303
Celery	10,195	Asparagus	1,272
		Peppers	1,066

Wide Fluctuation in Production

The total value of all fruits in the census year 1919 was 755 million dollars. In 1920, it was 744 million dollars. In 1921, particularly by reason of killing frosts in the early spring which reduced the production of apples, peaches, and other orchard fruits, and also by reason of somewhat lower market prices, the value was only 525 million dollars.

The severe reduction in 1921 can best be shown by comparing 1920 and 1921 apple figures. In 1920, our crop was nearly 224 million bushels, whereas in 1921, it was only 97 million bushels.

Peaches dropped from 17 million bushels to 11 million bushels. These wide fluctuations in production create one of the most difficult problems in the marketing of fruits and vegetables.

PRODUCTION AREAS AND VALUES

The fruit industry is so widespread and includes so many crops, that to convey an adequate and interesting picture of it, we must discuss, first, the whole crop in its general bearings, and then the individual crops that are of the greatest importance.

Census and other government figures usually discuss fruits and nuts together. This is decidedly illogical from a marketing standpoint, as a totally different class of market men handle the different crops.

Nuts are distributed almost wholly through cooperative associations of nut growers and through the wholesale grocery trade, in both cases by individuals who have practically no contact with fruit marketing.

Classification of Fruits

Fruits themselves are usually classified under two headings: 1. Small fruits, including: strawberries, raspberries, loganberries, dewberries, currants, blackberries, cranberries, and other berries; 2. Orchard fruits, including: apples, oranges, peaches, pears, plums, prunes, almonds, apricots, figs, and other tree fruits.

Grapes are frequently treated separately but for our purpose we will include them with other fruits.

The Leading Fruit States

As you will see from Figure 1, the 10 states that in 1919 led in fruits and nut production in the order of their rank (based on acreage) are:

1. California
2. New York
3. Pennsylvania
4. Michigan
5. Ohio
6. Virginia
7. Georgia
8. Washington
9. West Virginia
10. Missouri

California is so far in the lead that no other state is likely to approach her rank for some time to come. When you consider the value of fruits

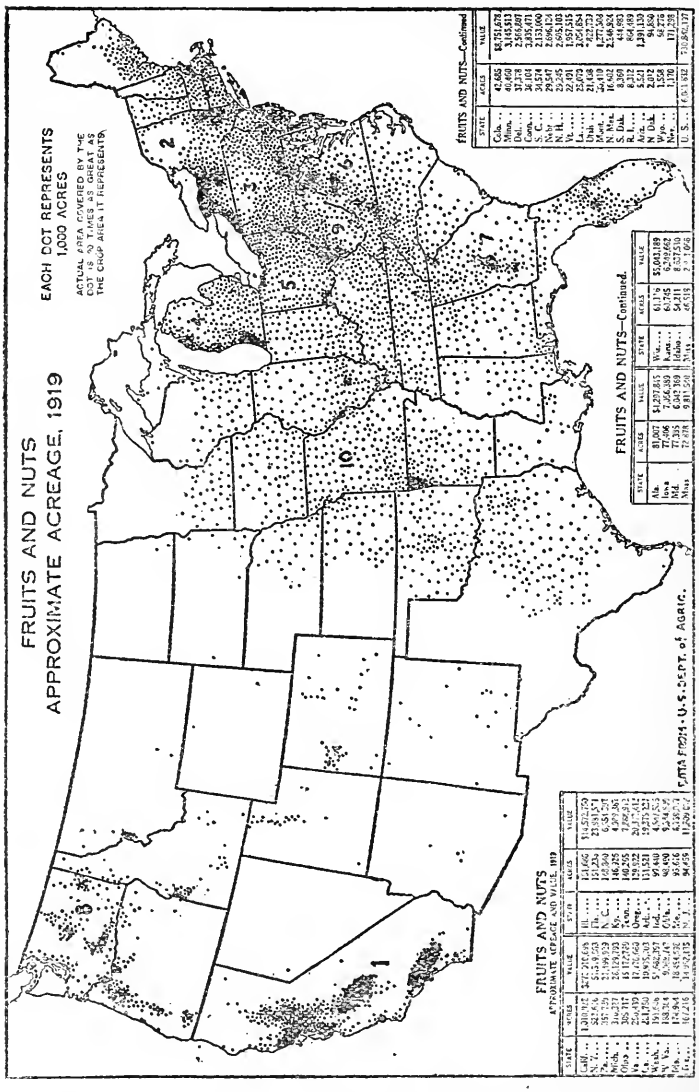


FIGURE 1. WHERE THE NATION'S FRUITS ARE GROWN

Take particular notice that there are more northern states leading in production than southern states. In fact Georgia is the only state in the South with a place among the first 10

produced in 1919, California produces one-third of the total value in all the states put together. In quantity, California produces one-sixth of the total.

Where California Excels

California leads all states in the production of citrus fruits. She is also third in the produc-

tion of apples, first in the production of grapes, and first in the production of peaches.

The production in her southern district is chiefly citrus fruits, walnuts, apricots, avocados, and dates. The production in the San Joaquin Valley is chiefly raisins, table and wine grapes, peaches, apricots, apples, figs, and some citrus fruits. In her northern district around Sacramento the production includes peaches, apricots, plums, prunes, grapes, walnuts, almonds, apples, and pears.

What Other States Produce

New York holds second place by being second in the production of apples, second in the production of grapes, and tenth in the production of peaches.

Florida's fruit acreage is devoted mostly to citrus fruits, with some peaches.

Georgia's production is mostly peaches and pecans.

The Important Fruits

No other fruit comes anywhere near to apples in value. When you consider the country as a whole, and for a series of years, apples stand way above all others. However, oranges and peaches hold important places. Some years, oranges are ahead of peaches, other years, peaches lead oranges.

In studying Table II, you will note the variations in the two years. But you will see that apples always lead. From the effective work that is being done to increase the use of oranges, it is reasonable to expect that oranges may exceed peaches in value in the future. However, this may not be true every year for so much depends upon frost. Sometimes the frost greatly reduces the orange crop; sometimes it interferes seriously with the peach crop.

It is important to remember that after apples, oranges, and peaches, fourth place in 1920 was held

by strawberries. In some years, the value of the strawberry crop is exceeded by grapes and by plums and prunes.

The place held by strawberries might be considered a little remarkable, due to the fact that strawberries commonly have rather a short season.

Table II. VALUES OF LEADING FRUITS

	1919*	1921*
1. Apples	$241,574,000	$163,000,000
2. Oranges	83,399,000	64,000,000
3. Peaches	95,570,000	52,000,000
4. Strawberries	29,303,300	35,385,200
5. Grapes	45,626,000	29,500,000
6. Plums and prunes	40,984,000	20,000,000
7. Pears	26,440,000	18,000,000
8. Cranberries	3,198,000	6,400,000
9. Apricots	12,223,000	5,400,000
10. Figs	2,812,000	1,400,000
11. Olives	1,416,000	800,000
	*Bureau of Census Figures	*Estimated

(Arranged in order of 1921 rank)

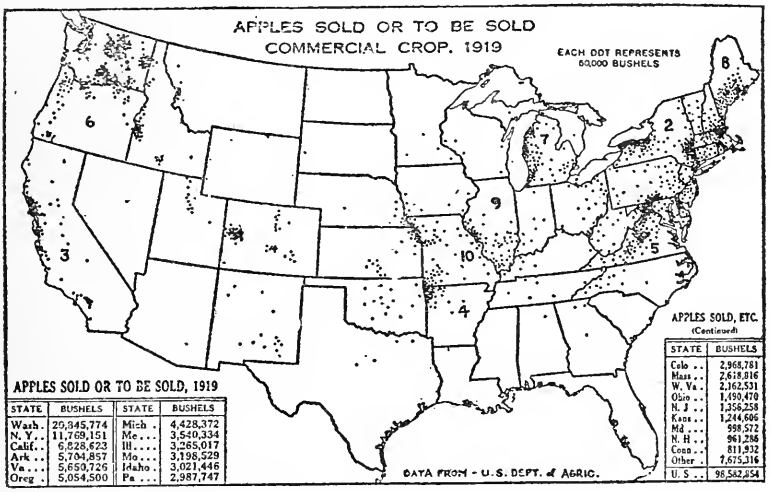
However, the development of varieties that bear throughout the entire summer and the increase in the plantings of strawberries in widely separated sections, has lengthened the season for this popular fruit.

Of the other fruits, the pear is the only one that holds a very high place so far as value is concerned.

It is not possible to give uniform statements regarding each variety of fruit, due to the fact that statistics are not available in many cases. However, the importance of apples, citrus fruits, peaches, strawberries and grapes justifies the special treatment given to each of these crops on the pages that follow.

SECTION 2. THE APPLE CROP

The apple is far and away in the lead in value of individual fruit crops. Even in 1921, with only about 37% of a crop in the eastern states that ship in barrels, the total estimated value on the farm was 163 million dollars.



STATE	BUSHELS	STATE	BUSHELS
Wash.	20,345,774	Mich.	4,428,372
N. Y.	11,769,151	Me.	3,540,334
Calif.	6,828,623	Ill.	3,265,017
Ark.	5,704,857	Mo.	3,198,529
Va.	5,650,726	Idaho	3,021,446
Oreg.	5,054,500	Pa.	2,987,747

STATE	BUSHELS
Colo.	2,968,781
Mass.	2,618,016
W. Va.	2,162,531
Ohio	1,490,470
N. J.	1,356,258
Kans.	1,244,606
Md.	998,572
N. H.	961,286
Conn.	811,932
Other	7,675,316
U. S.	96,582,854

FIGURE 2. WHERE COMMERCIAL APPLE CROP IS PRODUCED
Four of the principal states border on Canada, and only two, Arkansas and Virginia are in the South. You will see that Washington produced almost twice as much as the second state

Decrease in Number of Apple Trees

In 1910, there were in the United States of bearing and non-bearing trees taken together, 217 million. By 1920, the number had fallen to 151 million trees.

The decrease in bearing trees was from 151 million in 1910 to 115 million in 1920. This is a decrease of 36 million trees, or 23.8% for trees of bearing age.

The decrease in non-bearing trees was even greater, the number in 1920 being 45% less than in 1910.

Where Apples Are Produced

As you will see from Figure 2 the three Pacific Coast states hold important places in the production of apples. As a matter of fact, the Pacific Coast produced one-third of the apples grown in 1919, although it possessed only one-seventh of the bearing trees. Washington, with three great apple districts, the Yakima Valley in the south, the Wenatchee Valley in the north, and the Spokane Valley in the east, led all states.

Western States Pack in Boxes

The western crop is packed in boxes, and in addition to the Washington districts, is obtained in commercial quantities from the Hood River and Willamette Valleys of Oregon, the Boise district in Idaho, and Bitter Root Valley in Montana.

The Sonoma and the Watsonville districts in California, the Salt River Valley in Utah, the Grand Junction-Delta Montrose district of Colorado, and all of the states east of the 100th meridian pack practically 100% of the winter crop in barrels, using boxes to a very slight extent, but using bushel baskets extensively for the early varieties.

Important Eastern Districts

In the East, the most important areas are the Hudson Valley and Lake Erie districts in New York, the New England area, the Appalachian territory, including parts of Maryland, Virginia, and West Virginia, the southern Illinois territory, Western Michigan, the Ozarks in Arkansas and Missouri, and the Northwestern Missouri district.

Effect of Freight Rates on Production

About 15% of the apple trees of bearing age in 1920 were located in the western half of the United States and of this 15%, almost half is in the state of Washington. There has been relatively little planting of new orchards anywhere in the United

States. This has been especially noticeable in the West, during recent years. This reduction in the West is due particularly to high freight rates which make it impossible to ship anything except the first class fruit to market. It costs almost 80 cents a box to ship apples from Wenatchee to New York. If western apples were packed in barrels, this would amount to $2.40 a barrel, so that the burden of freight rates is readily apparent.

Why the Reduction in Trees Occurred

The reduction in number of trees has taken place chiefly in ill-adapted regions and, as a consequence, it is not as significant as it would otherwise be. While there has been no great planting movement in recent years, there has been much new planting at certain times in the best adapted commercial growing sections.

In New York State, the premier apple growing section of the East, four important counties increased in number of bearing trees in 10 years by 300,000.

Production Per Tree Is Increasing

During the 10-year period, the yield per tree has increased 20%. This is due, no doubt, to better spraying, fertilizing, pruning, and to the location of the larger part of the industry in better adapted apple growing sections.

SECTION 3. THE CITRUS CROP

Oranges, lemons, and grapefruit compose the bulk of this crop. There are minor quantities of tangerines, kumquats and one or two other lesser members of the citrus family.

Oranges are by far the most important. California is far in the lead, with Florida ranking second. The Gulf Coast has a small acreage confined almost exclusively to the Satsuma variety. Florida

grows a number of varieties, practically all of the seeded kinds. California grows almost exclusively the Washington Navel and the Valentia Late, although the St. Michael, the Mediterranean Sweet and a few other varieties are grown in small quantities.

Where Citrus Fruits Are Grown

While oranges are grown generally throughout the citrus belt, lemons are confined practically to California and grapefruit to Florida. California produces only about 400 cars of grapefruit a year, and Florida does not produce any commercial quantities of lemons.

Subtropical fruits to which the citrus belong cannot withstand more than a few degrees of frost, hence the strict geographical limitation as to area.

California production of citrus fruits is concentrated in three localities. The southern section is practically confined to five counties, including Los Angeles, Riverside, San Bernardino, San Diego, and Ventura. The next district in importance is north of Tehachapi Pass in the San Joaquin Valley, and is confined largely to Tulare County. In the Sacramento Valley north of San Francisco there is also a considerable commercial production by reason of the relatively frostless climate.

How California Markets Oranges

Figure 3 is a chart which shows the total citrus crop of California and the proportion shipped by the growers' own company, the California Fruit Growers' Exchange.

It is evident from this figure that in the seasons of 1895-96 and 1896-97 the total citrus crop of California was between 8,000 and 9,000 cars, and that only about one-third of it was handled by the California Fruit Growers' Exchange. The full length of each column represents the total crop; the black portion, the part handled by independent shippers;

and the part from the base line to the black column the part handled by the Exchange.

In a general way, it will be observed that the quantity handled by independents has remained relatively stationary for 20 years, while the quantity handled by the Exchange has risen from about 3,000 cars to more than 40,000 cars.

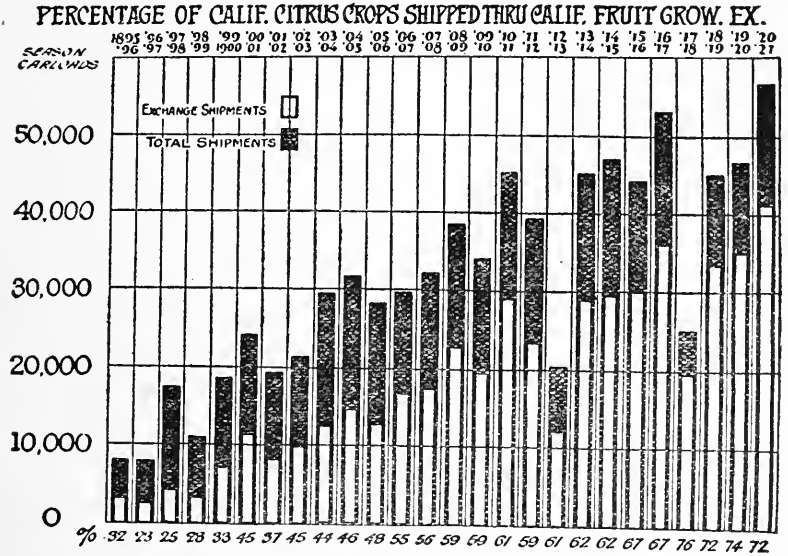


FIGURE 3. HOW GROWERS HAVE MARKETED THEIR CROPS
Notice the white areas in the bars. They represent the citrus fruits shipped by the growers' own organization. Notice how the total amount has grown, and how some years are extremely poor

An inspection of the graph also shows how seriously the crop is affected by frosts. In 1912-13 the crop was less than 50% of normal, as it was in 1917-18.

Quantity and Value

As an illustration of the extent of production and value of the citrus fruit crop in California and Florida (the only states for which reliable estimates are available), the figures in Table III are given.

Table III. PRODUCTION OF CITRUS CROPS

(Figures given in round millions)

Year	Florida		California		Value
	Boxes	Value	Boxes	Value	Boxes: Value
1919	7	$18	16	$43	23 : $61
1920	8	$18	22	$47	30 : $65
1921	8	$15	23	$50	31 : $65

The severe frost in California for three successive days about January 23-25, 1922, severely reduced the California crop. However, a frost in the case of citrus crops usually is more effective in reducing the crop of the succeeding season than the crop which is being harvested when the frost occurs.

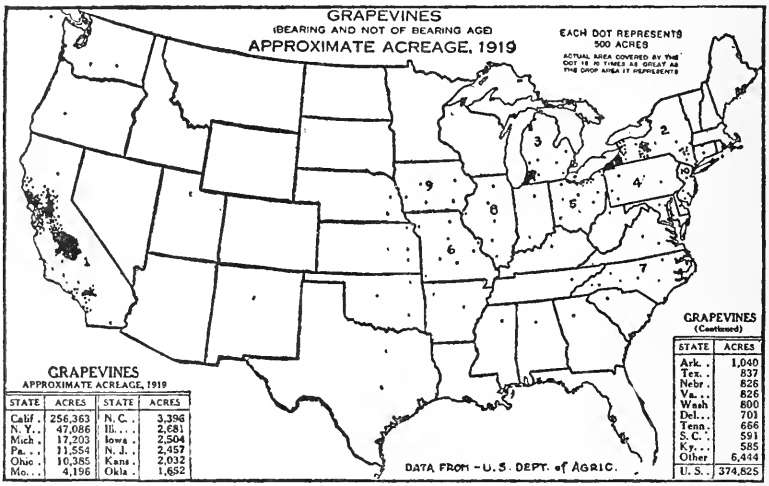


FIGURE 4. THE GREAT GRAPE SECTIONS ARE IN THE NORTH

North Carolina is the only state south of the Mason and Dixon Line producing a good quantity of grapes. California produces more than all of the rest of the states put together

SECTION 4. THE GRAPE CROP

The great grape growing sections are located in west central and western New York, northwestern Pennsylvania, western Michigan, and California. While commercial quantities are grown in a number of other

states, particularly in the Lake Erie section of Ohio, fully 90% is grown in the states named.

Figure 4 shows the distribution of the acreage of grape vines and indicates the importance of the California crop. Two-thirds of the nation's acreage is in that state.

The California crop includes a wide range of varieties of table, wine, and raisin grapes. The most important table grape centers are Lodi and Cucamonga.

The most important wine grape centers are Sonoma, Napa, and Santa Clara. Fresno is the center of the raisin grape industry. It should be remembered, however, that table and wine grapes are grown to a considerable extent in all of these territories.

The western Michigan grape district is in the section around Paw Paw.

The western New York area is usually designated as the Chautauqua Erie grape district, while the central New York area is in the Finger Lakes region.

Eastern grapes are mostly of the Concord, Delaware, and Niagara varieties. Western grapes include Tokays, Cornichons, Thompson Seedless, and the Oriental, and South European varieties.

Tonnage of Fresh Grapes Shipped

The crop season of 1922 for fresh grapes was practically over by November 15. Up to that time the northern California district had shipped 13,102 cars. The central district, which centers around Lodi, had shipped 20,129 cars. The southern district had shipped 3,841 cars.

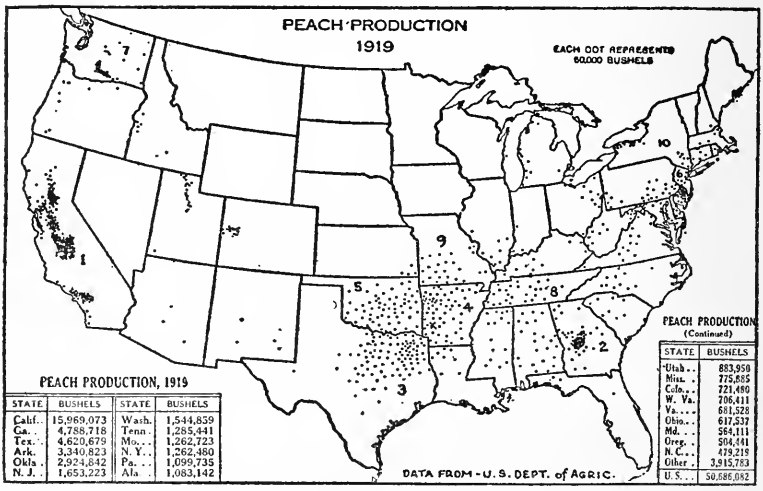
New York had shipped 7,488 cars, and all of the New York sections combined, shipped 7,913 cars, which brought the total shipments for the year to 52,473 cars on November 15 with some small tonnage still to be shipped in California.

The total shipments for 1921 were 37,203 cars.

SECTION 5. THE PEACH CROP

Peaches are, with justice, regarded as a speculative crop, and production fluctuates between very wide extremes, although there has been a progressive increase during the twenty-two years from 1899 to 1921.

Figure 5 shows the wide distribution of commercial peach production extending through the more temperate parts of the country.



PEACH PRODUCTION, 1919

STATE	BUSHELS	STATE	BUSHELS
Calif.	15,969,073	Wash.	1,544,859
Ga.	4,788,718	Tenn.	1,285,441
Tex.	4,620,679	Mo.	1,262,723
Ark.	3,340,823	N. Y.	1,262,480
Okla.	2,924,842	Pa.	1,099,735
N. J.	1,653,223	Ala.	1,083,142

PEACH PRODUCTION (Continued)

STATE	BUSHELS
Utah	883,950
Miss.	775,885
Colo.	721,480
W. Va.	706,411
Va.	681,528
Ohio	617,537
Md.	564,111
Oreg.	504,141
N. C.	479,219
Other	3,915,763
U. S.	50,686,082

FIGURE 5. THE SOUTH LEADS IN PEACH PRODUCTION

While California is the leading state, the South is the leading section in peach production. Notice the rank of states as indicated by the numbers on the map

The northern Prairie States grow practically no peaches by reason of the severity of the winter cold. California produced nearly one-third of the nation's crop in 1919, outstripping all other states. Fresno County, a great raisin grape section, alone producing one-tenth.

Decrease in Acreage

In 1910, there were 95 million bearing peach trees in the United States. In 1920, this number

had been reduced to 66 million, a reduction of 29 million in the number of trees of bearing age.

Peach trees are so susceptible to bacterial and insect enemies, and to cold, that the number of trees that die each year is very heavy. This reduction in total number of bearing trees, as was the case with apples, is not as significant as it might be, by reason of the fact, that the plantings that remained are more largely in commercial orchards, and hence, have a greater productive capacity than the farm orchards of earlier years.

The number of trees not of bearing age in 1910 was 42 million, and the number in 1920 was 21 million, a decrease of more than 20 million or over 48%.

Fluctuation in Crop Production

The peach crop fluctuates extraordinarily from year to year. A normal crop would amount to about 46 million bushels. As long ago as 1900, a crop greater than that figure was produced. In 1915, the largest crop in our history was picked, totalling 64 million bushels.

Car-lot Shipments by States

The United States Bureau of Markets has, for a period of years, been securing from all of the railroads, telegraphic reports of the movement along their lines. These data have been kept for a sufficient number of years to be of distinct interest. Table IV shows the five year average and the total shipments for 1921 and 1922.

Notice the distinct fluctuations from year to year.

The peach producing sections that show the most consistent growth during recent years are located in North Carolina, Tennessee, New Jersey, New York, Illinois, and California.

Table IV. CAR-LOT SHIPMENTS OF PEACHES, BY STATES

(arranged in order of 1922 rank)

State	Average 1917-1921	Total 1921	Total 1922
1. California	6,035	7,606	8,365
2. Georgia	7,125	10,636	7,347
3. New York	3,460	2,840	6,521
4. Illinois	175	1	1,660
5. Michigan	655	198	1,570
6. Arkansas	950	596	1,518
7. New Jersey	885	5	1,507
8. North Carolina	225	589	1,435
9. Colorado	1,155	1,219	1,432
10. Utah	815	839	1,103
11. Washington	1,215	1,097	958
12. Maryland	460	1	426
13. Delaware	145		422
14. Indiana	25		350
15. Missouri	75	1	278
16. Tennessee	130	218	248
17. Virginia	140		228
18. Pennsylvania	370	45	208
19. Ohio	270	76	200
20. Oklahoma	285	42	153
21. Idaho	125	103	124
22. South Carolina	50	31	78
23. Oregon	45	60	46
24. Texas	1,075	964	26
25. Alabama	115	47	25
26. West Virginia	440		7
27. New Mexico	35		3
28. Connecticut	55	73	1
Other States	29	13	28
Total	26,564	27,300	36,267

Section 6. WHERE STRAWBERRIES ARE GROWN

Strawberries are widely grown in the United States, but the regions of commercial production are concentrated in a relatively small number of areas.

Table V. STRAWBERRY SHIPMENTS

(In order of 1922 rank)

States	1922
	Cars
1. Tennessee	3,772
Dayton, Evansville, Spring City, Humboldt, Medina, Dyer, Sharon	
2. Arkansas	2,069
Judsonia, Bald Knob, Van Buren, Springdale, Johnson, Alma	
3. Missouri	1,856
Neosho, Sarcoxie, Monett, Pierce City	
4. Maryland	1,634
Marion, Pittsville, Fruitland, Princess Anne	
5. Virginia	1,621
Norfolk Section, Onley	
6. Louisiana	1,608
Independence, Hammond, Amite, Ponchatoula, Tickfaw, Pickups	
7. North Carolina	1,105
Chadbourn, Mount Tabor, Teacheys, Rosehill, Mount Olive	
8. Delaware	928
Selbyville, Bridgeville	
9. Kentucky	754
Bowling Green	
10. Alabama	450
Castleberry, Atmore, Cuba, York, Cullman, Thorsby	
11. Florida	325
Plant City, Starke, Lawtey	
12. New Jersey	277
Port Norris, Landisville	
13. Illinois	246
Anna, Villa Ridge, Farina	
14. Mississippi	96
Osyka, Sanford, Russell, Madison, Durant	

The most important production centers are in Cumberland, Camden, Burlington, and Atlantic Counties, New Jersey; Sussex County, Delaware, Wicomico, Worchester, Caroline, and Anne Arundel Counties, Maryland; Hamilton, Rhea, Crockett, Gibson, Lauderdale, and Madison Counties, Tennessee; Warren County, Kentucky; Barry, Lawrence, McDonald, and Newton Counties, Missouri; and the adjacent counties of Washington and Benton, Arkansas; White County, Arkansas; Tangipahoa parish, Louisiana; Berrien County, Michigan; Sonoma, Sacramento, and Los Angeles Counties, California; and Hood River County, Oregon.

There are three thousand counties in the United States, and the 29 names had one-third of the nation's acreage of strawberries in 1919.

Like other perishable crops, the strawberry crop fluctuates greatly. The total shipments for the six years from 1916 to 1921 were as follows:

1916...	16,236 cars	1919...	8,105 cars
1917...	15,065 cars	1920...	8,490 cars
1918...	8,452 cars	1921...	10,681 cars

The best picture, from a commercial standpoint, of the size of the strawberry crop and the areas of commercial production, with the amount of production, can be obtained from a study of Table V showing the principal shipping points.

PART II

Section 1. PRODUCTION AREAS AND VALUES OF VEGETABLES

In considering questions of vegetable marketing, it must be borne in mind, that three sets of conditions prevail in vegetable growing in the United States.

1. There is a vast quantity of garden truck grown for home consumption in home gardens which never enters into commerce.

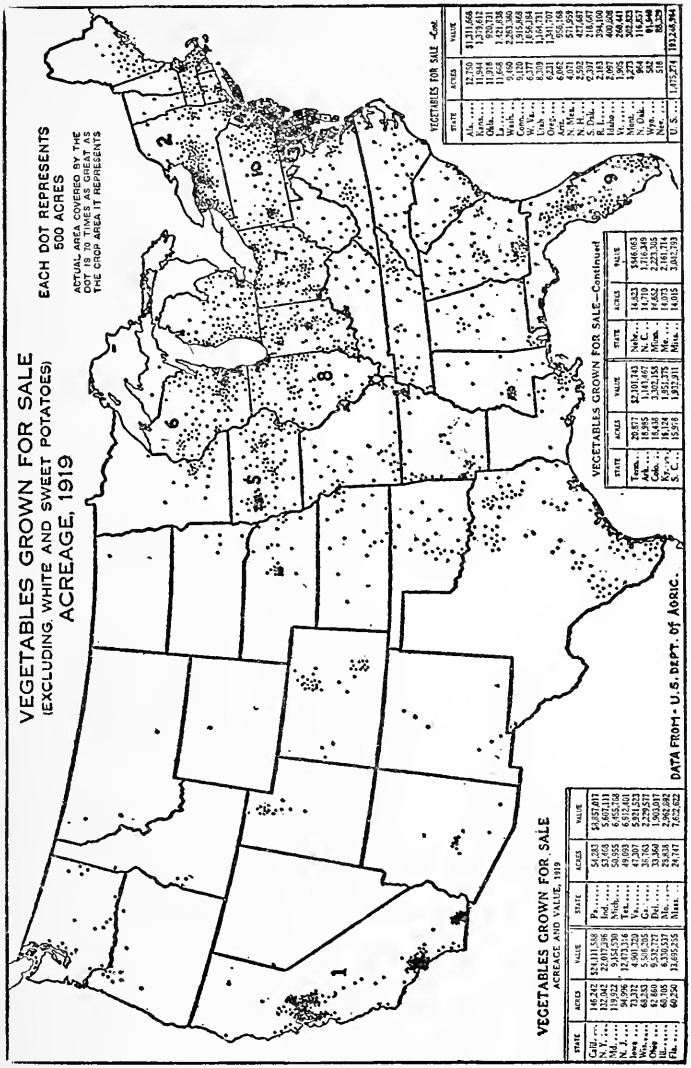


FIGURE 6. WHERE COMMERCIAL VEGETABLES ARE GROWN

A large local demand is necessary for the development of commercial vegetable growing. That is why the big producing centers are near large cities

2. A notable quantity of vegetable crops is grown within a relatively short radius of all of our great population centers under what may be called market gardening conditions.

3. The two previously mentioned sources of supply fall short, both as to time of availability

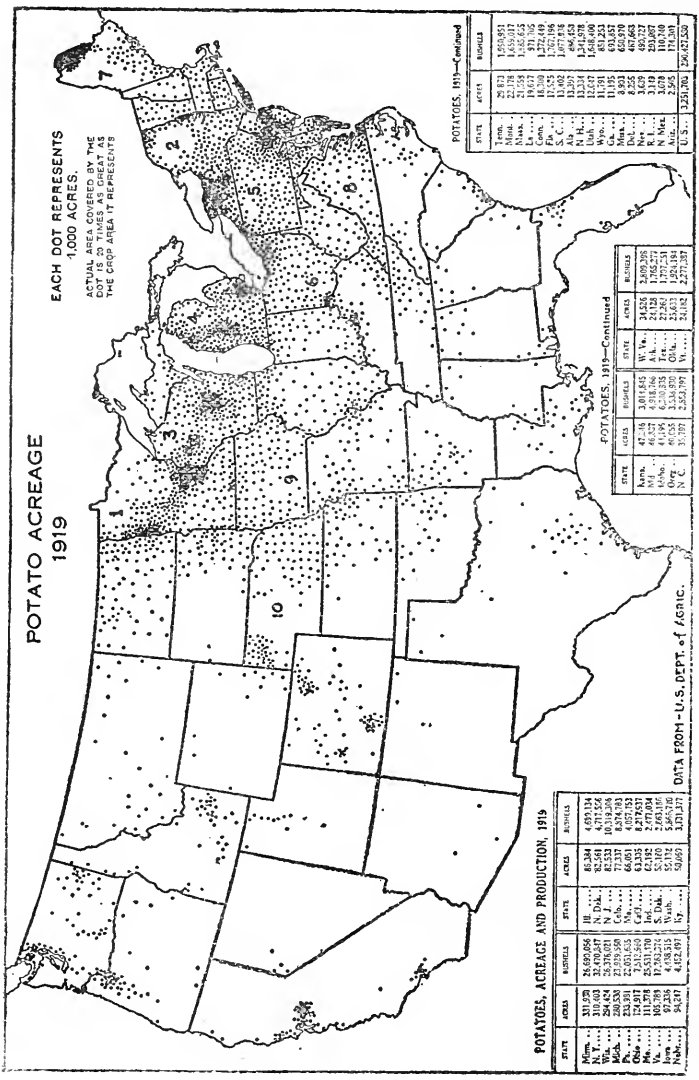


FIGURE 7. THE NORTH GROWS THE NATION'S POTATOES

As you will see by the numbers that indicate the rank of states, most of the commercial potato crop is grown in the North. The southern states grow early potatoes mostly

and quantity for supplying the needs of our metropolitan populations which gives rise to vegetable production in what may properly be termed "concentrated truck growing sections." These concentrated truck growing sections are shown in Figure 6.

The order of leadership in 1919 was:

1.	California	6.	Wisconsin
2.	New York	7.	Ohio
3.	Maryland	8.	Illinois
4.	New Jersey	9.	Florida
5.	Iowa	10.	Pennsylvania

The map indicates the vegetables grown in trucking centers and under market gardening conditions. It should be noted that potatoes and sweet potatoes are excluded in this particular map, but that white potatoes are shown in Figure 7.

Onion and cabbage production, for the winter market, is scattered through the states practically from western New York to Iowa. Generally speaking, the market gardening areas can be found on the map near the large population centers.

The Leading Vegetable Crops

The value in the order of their positions, (1919) including potatoes and sweet potatoes, is shown in Table VI.

Table VI. VALUE OF MOST IMPORTANT VEGETABLE CROPS
(000's omitted)

Rank in 1919	1919	1920	1921
1. Potatoes	$514,855	$461,778	$385,192
2. Potatoes, Sweet.	135,514	117,834	86,910
3. Tomatoes	38,675		
4. Onions	23,543	17,567	18,856
5. Cabbage	17,881	20,110	16,576
6. Sweet Corn	17,298		
7. Cantaloupes	17,133	17,256	15,050
8. Celery	9,462		
9. Lettuce	8,200	11,384	15,042
10. Watermelons	7,515	11,281	11,523

The combined value of the 10 important crops shown in Table VI was about 83% of the value of all vegetable crops in 1919.

The most important area of production of vegetables for sale, naturally, includes the area of greatest population and territory within easy shipping distance of the densest population. This area extends along the Atlantic Coast from Long Island to the northern line of North Carolina. In this area, about one-fifth of the nation's commercial vegetable crop is produced.

A second area of unusual importance lies in western New York extending from the vicinity of Utica to and southwest of Buffalo.

The southern Lake Michigan section supplying Chicago stands next in importance.

Florida and south Georgia are important, not only because of the quantity they produce, but, because of the fact, that they supply the market during the winter months when northern territories are not marketing. About one-third of the winter vegetables come from this area. Texas is also an important winter shipper.

California is an important year round shipper but of more than ordinary importance in the late fall, winter, and early spring. The chief production of the southernmost of the three concentrated California districts is the Imperial Valley, whose most important crops are muskmelons, lettuce, honeydew melons, and green peas. The neighboring valley to the north, Coachella Valley, is an important early onion district.

The Los Angeles district is particularly important in lettuce, celery, cabbage, onions, asparagus, tomatoes, potatoes, and miscellaneous small vegetables. The Sacramento district is especially important in asparagus and celery.

To indicate the importance of the state of California in the production of vegetables <u>for sale,</u> it may be stated, that this state produces almost 10% of the total for the United States. In 1919, it pro-

duced 57% of the asparagus; 27% of the muskmelons; 27% of the celery; 33% of the lettuce; and 13% of the onions.

While it is not possible to give an individual discussion of each important vegetable crop, a brief statement follows on those constituting by far the greater part of the tonnage and value.

Section 2. THE POTATO CROP

Irish potatoes are divided into two commercial crops. The early or southern crop, and the late or northern crop.

The early crop is far more perishable than the late crop. It is grown largely in the southern states and begins to appear on the market from Florida as early as March.

Where Early Potatoes Are Grown

The chief producing section in Florida is in the vicinity of Hastings, and the climax of shipments is usually reached around the first to the middle of May. Heavy shipping comes from states farther north in late May and early June. The climax of southern shipments is reached in the section around Beaufort, S. C.

The next heavy shipping territory is on the low coastal plain lands in the vicinity of Charleston, S. C., where the peak of shipments usually falls around the 10th to the 15th of June.

The section in the counties around Florence, S. C., has gained in importance during recent years. It markets its crops at very nearly the same time as the Charleston section. Then the territory around Elizabeth City, N. C., comes into bearing and after that, what is generally known as the Norfolk section, begins to ship.

Later, or almost at the same time, the Eastern Shore of Virginia and Maryland begin to ship, and finally the early crop usually concludes with the Long Island shipments in August.

The season of shipments in some cases is rather brief, so far as real quantities are concerned. South Carolina, for instance, begins shipping in normal years about May 1, and after June 30, usually does not ship a single car. On the other hand, some of the early potato sections, like the Eastern Shore of Virginia, begin shipping around June 1 and continue until September 30, while New Jersey and Long Island not only raise potatoes for the early market, but are also winter potato producers.

A similar situation occurs further west. Texas and Louisiana begin to ship early and, as the season grows, later commercial shipments of early and medium early potatoes arise further north, usually concluding with heavy shipments from the Kaw Valley of Kansas.

The early crop of potatoes is of unusual commercial value by reason of its being in the luxury class. It is estimated that about 17% of the total crop in a normal year is made up of early varieties.

Where Late Potatoes Are Grown

The heaviest regions of potato production are in the northern United States and, generally speaking, these areas lie north of the Corn Belt.

The quality and yield of potatoes are best in a cool climate, particularly in regions that have warm, sandy, or loamy soils. Minnesota, New York, Wisconsin, Michigan, Pennsylvania, and Maine are the most important producing states, as you see from a study of Figure 7.

During 1921 and 1922, North Dakota has grown immensely in its commercial production, and the acreage, in 1922, was estimated to have exceeded the 1921 acreage by 270%. There were increases in acreage in other states in 1922, and in some territories unusually favorable production conditions prevailed.

As a result of this great increase, prices were the lowest that have been known in recent years. The average farm price on November 21, 1922, was 68.8 cents per bushel, whereas on the same date in 1921, the value was $1.23 per bushel.

Where Shipments Originate

Table VII shows by state of origin, season of shipment, and number of car-lots shipped, the relative importance of all of the principal potato shipping states as reported to the U. S. Bureau of Agricultural Economics.

Table VII. CAR-LOT SHIPMENTS OF POTATOES

Leading Sections (Late)	1921-1922	1920-1921	1919-1920
1. Maine	37,968	17,817	23,444
2. Minnesota	29,652	23,214	22,058
3. Colorado	17,809	11,345	8,810
4. Michigan	15,033	17,119	12,237
5. Idaho	14,641	8,143	6,853
6. Other New York	14,001	11,001	9,116
7. Wisconsin	10,946	18,661	21,975
8. North Dakota	10,487	1,846	2,229
9. California	9,254	10,090	8,487
10. Washington	6,224	3,765	3,098
11. Nebraska	5,301	3,071	1,661
12. New York, L. I.	4,929	5,501	3,701
13. Pennsylvania	3,573	6,489	3,742
14. South Dakota	3,353	1,926	689
15. Montana	1,820	949	352
16. Oregon	1,391	1,756	786
17. Utah	1,074	563	426
18. Nevada	464	415	689
19. Iowa	89	922	251
Total Leading Sections (Late)	130,604	144,593	188,009

Table VII. (Continued)

Other Sections (Late)	1921-1922	1920-1921	1919-1920
1. New Jersey	10,475	17,147	10,409
2. Kansas	2,379	1,982	1,132
3. Virginia	1,267	1,687	674
4. Wyoming	953	545	265
5. Kentucky	640	1,132	866
6. Maryland, 2d crop	567	846	725
7. Vermont	303	90	43
8. Missouri	300	224	115
9. Arizona	222	40	80
10. New Hampshire	130	56	48
11. Delaware	118	158	172
12. Illinois	96	96	123
13. West Virginia	37	71	4
14. Rhode Island	32	4	47
15. Ohio	28	141	90
16. Indiana	10	52	4
17. New Mexico	3	3	7
18. Massachusetts	2	7	11
19. Connecticut	0	20	74
Total Other Sections (Late)	17,562	24,301	14,889

Southern Crop Sections	1921-1922	1920-1921	1919-1920
1. Virginia	18,273	14,943	11,520
2. North Carolina	3,599	3,513	3,306
3. South Carolina	2,510	3,070	1,217
4. Florida	2,344	3,351	2,275
5. Maryland	2,123	2,259	1,434
6. Louisiana	1,163	887	559
7. Texas	1,109	738	808
8. Alabama	696	308	90

9. Oklahoma	281	592	677
10. Georgia	191	274	126
11. Arkansas	135	236	186
12. Mississippi	116	82	151
13. Tennessee	27	18	28
Total Southern Sections	32,567	30,271	22,377
GRAND TOTAL	238,138	199,165	167,870

Distribution of Shipments by Months

Because of the succession of early and late districts, and the ease of storing potatoes at the shipping point rather than at the terminal market, shipments have come to be quite regular throughout the year. For example:

During the year beginning August 1, 1921, and ending July 31, 1922, the shipments in no month were less than 10,000 cars. The heaviest shipments were in October, with 43,250 cars; the next heaviest shipments occurred in September, with 26,040 cars.

Imports and Exports

While apples are the most important of our perishable fruit and vegetable products in the export trade, potatoes, nevertheless, have been shipped out of the country annually to the extent of over 4 million bushels in some years. The average exportation for the period 1911 to 1913 was 1,814,000 bushels. Exports for 1918 were 2,852,000 bushels; for 1919, 3,642,000 bushels; and for 1920, 4,154,000 bushels.

The importation of potatoes has generally been on a much larger scale than the exportation. The average imports for 1911 to 1913 were 5,707,000 bushels.

The chief sources of imported potatoes are Canada and Denmark. The Canadian importations come

largely from New Brunswick and Prince Edward Island.

From Denmark there were imported 812,090 bushels during the 1920-21 season.

THE SWEET POTATO CROP

The sweet potato has grown very largely in commercial importance during and since the World War. In 1900, the farm value of the sweet potato crop was nearly 25 million dollars, and in 1910, it had risen to over 40 million dollars.

Production Areas

The most important producing states in their order of production are Georgia, Alabama, South Carolina, Mississippi, Louisiana, North Carolina, Texas, and Virginia. New Jersey and Delaware, though not so important in quantity of production, are exceedingly important by reason of the fact that practically all their crop is grown for shipment.

Value of Crop

The value of the sweet potato crop for three years was:

1919	1920	1921
$135,514,000	$117,834,000	$86,910,000

It is to be noted that the 1919 value was $48,604,000 more than the 1921 value. The 1921 crop, because of adverse conditions, chiefly due to drouth, was relatively small, contributing to the lessened value of that year. Another important factor was the reduced value per bushel. The 1921 farm value on December 1 was estimated at 94.7 cents per bushel, while the 1919 value on the same date was $1.34.

Storage Facilities

An important factor in the growing commercial importance of sweet potatoes is the construction of suitable storage and curing houses. Under the leadership of the United States Department of Agriculture, assisted effectively by the state agricultural

forces, there has been built in the neighborhood of 3,000 sweet potato storages with a combined capacity exceeding 12 million bushels! Approximately half of these houses are commercial, and this half makes up about 10 million bushels of the total capacity.

Georgia alone has facilities for storing over 2 million bushels. Delaware, Texas, Louisiana, and Tennessee, each have storage capacity for more than a million bushels. Sussex County, Delaware, is the most important county in the United States in this respect, with facility for over a million bushels.

Commercial Varieties

A very large number of varieties are grown. However, scarcely a dozen are of real commercial importance.

Dry, mealy sweet potatoes sell best in northern markets. The most important variety of this class is the Big-Stem Jersey. Southern markets buy moist, fleshy varieties most readily, and the most important in this class are the Nancy Hall and the Porto Rico. The most important medium dry variety is the Triumph.

The four varieties named probably constitute 75% of the commercial shipping crop. The Yellow Jersey, the Southern Queen, and the Pumpkin are commercially important in some growing and consuming sections.

The Georgia variety is the one most extensively grown for home use in the Gulf and South Atlantic States.

Section 3. THE TOMATO CROP

Tomatoes are grown for table use, for canning, and preserving. The canning and preserving industry is usually based on contracts between growers and canning factories in various sections of the country. The most important canning territory includes parts of the states of New York, New Jersey, Delaware, Maryland, and Virginia, although there are very

important canning sections in other parts of the country.

It is not the purpose of this lesson to discuss the canned tomato industry, by reason of the fact, that marketing problems, in the ordinary sense, are settled by the contract between the grower and the cannery.

Tomatoes for table use or slicing purposes are shipped in car-lot quantities from many sections, but the most important, based on shipments for a series of representative years, are shown in Table VIII.

Considering tomatoes grown for all purposes, Eastern Maryland, Delaware, and Southern New Jersey include over one-third of the nation's acreage, and the Los Angeles and San Francisco Bay districts in California about one-tenth.

Virginia and Indiana rank next in importance. The major part of the crops in these states, however, goes into cans.

Turning back to Table VII, it will be seen that, excluding potatoes and sweet potatoes, tomatoes are the most valuable vegetable crop grown in the United States. Figures for the census year 1919 are the only ones available. In that year, the crop was worth $38,675,000.

Where Imported Tomatoes Come From

The luxury loving markets of the United States crave a variety of fruits and vegetables, both in and out of season. Although California and Florida cover the winter season fairly as to time, there are periods when they do not ship, or when the quantity of tomatoes shipped is insufficient to meet the demand.

As a result, there has grown up during the past 10 years in the states of Sonora and Sinaloa, Mexico, a fresh tomato growing and shipping business. These tomatoes enter the United States usually by the way

Table VIII. FRESH TOMATO PRODUCING SECTIONS

Producing Sections In order of Rank	Average No. Cars	Principal Loading Stations
1. Florida (East Coast)	4,000	Homestead, Larkin, Perrine, Pompano
2. California	2,000	Los Angeles, San Jose
3. Florida (West Coast)	1,500	Plant City, Tampa
4. Mississippi (Central Southern)	1,400	Crystal Springs, Hazelhurst
5. Texas (Eastern)	1,200	Jacksonville
6. New Jersey (Southern)	1,110	Swedesboro
7. Tennessee (Central Western)	800	Humboldt, Milan
8. Ohio (Southeastern)	600	Marietta, Lowell
9. Illinois (Southern)	350	Anna, Cobden
10. Missouri (Eastern)	125	St. Louis

Florida is by far the most important producer for the winter market. For instance, it was estimated that there were planted in the autumn of 1922, 15,000 acres in that state. Weather and other conditions play so important a part that it is impossible to state what the total crop will be from the acreage planted, but it would not be out of order to expect from 6,000 to 7,000 cars from the East Coast alone.

of Nogales, Arizona. By reason of soil and disease troubles, there is great variation in the acreage and shipments from year to year. Roughly, it may be said that the shipments vary from 700 to 1,500 cars a season.

The most important growing section is in the valley of the Fuerte River. Production methods are not up-to-date, the best market varieties are not always grown, and packing and shipping methods are crude. As commercial conditions in Mexico improve, so that American enterprise can more safely invest in that Republic, this business will, no doubt, assume fairly large proportions, as there are other sections of Mexico even better adapted than the West Coast to tomato growing.

SECTION 4. THE ONION CROP

The onion crop is divided into the early or Bermuda crop and the late or winter crop.

With respect to early crops of each of the important vegetables, it should be observed that the likelihood of profitable marketing usually depends, to an important extent, on the amount of the winter crop that remains on hand in storage at the usual season of movement of the early fresh crop. For example, if there is a large quantity of winter stored potatoes available, a large part of the consuming public will continue to use old potatoes by reason of their cheaper price. In times of great prosperity, this condition is not so noticeable, so that, during the war, it happened on occasion, that as high as $10 per 180 pound barrel were paid for new potatoes, while perfectly good winter potatoes would scarcely bring shipping charges.

How Storage Affects the Onion Market

The same condition may prevail with respect to onions. When old crop supplies clean up, or practically clean up, by April 1 to 15, the new crop outlook is regarded as favorable. If the crop cleans

up by April 1, the California grower has an advantage, as his heaviest shipments usually occur about April 10 to 15. If the clean up is completed by April 15, the Bermuda grower in the section around Laredo, Texas, considers it distinctly to his advantage, as his shipments begin usually about March 25 and conclude by June 1.

Where Early Onions Are Grown

The important early onion crop states are California, Louisiana, and Texas. The most important late crop states are New York, California, Ohio, Indiana, Massachusetts, New Jersey, Michigan.

Table IX. CAR-LOT SHIPMENTS OF ONIONS BY STATES OF ORIGIN

	Rank in 1921	1919	1920	1921
1.	Texas	2,876	5,086	4,209
2.	California	5,219	4,526	3,648
3.	New York	2,588	2,721	3,564
4.	Massachusetts	2,917	3,373	2,835
5.	Indiana	1,158	2,646	2,428
6.	Ohio	1,890	2,909	2,128
7.	Michigan	308	576	591
8.	Washington	611	766	585
9.	Iowa	502	824	466
10.	New Jersey	638	629	436
	All other states.	2,167	1,894	2,469
	Total	20,874	25,950	23,359

Minnesota, Iowa, Wisconsin, and Kentucky. Naturally, there is variation from year to year by reason of crop conditions in the ranking of the states.

Table IX, showing car-lot shipments, for the years from 1919 to 1921, inclusive, will give a fairly clear idea of the location of the industry:

The Texas Bermuda Onion Crop

The Texas Bermuda onion crop is a short season crop, being similar in this respect to the Imperial

Valley cantaloupe crop. During a period of about 60 days, a crop of from 3,000 to 6,000 cars of a decidedly perishable product must be moved from the banks of the Rio Grand on the Mexican border to the consuming markets in the more populous centers of the United States.

The first cars usually move during the last few days in March. Before the end of April, if no unfavorable conditions arise, a few shipping stations will be sending to market daily 200 or more cars. Shipments then gradually taper off so that by the middle of May not more than 25 cars per day may be moving, and by June 1, the movement will have ceased completely.

Market Distribution

During the spring of 1922, the Bureau of Markets traced to primary destination 3,786 cars originating in the Laredo district. The importance of various markets is illustrated in part by Table X, which

Table X. THE MOST IMPORTANT ONION MARKETS, 1922

Primary Destination	Number of Cars	Primary Destination	Number of Cars
St. Louis	1,328	Philadelphia	92
New York	522	Pittsburgh	85
Chicago	227	Kansas City	62
East St. Louis	167	Houston	41
Boston	133	Fort Worth	40
New Orleans	124	Buffalo	29
Taylor, Texas	109	Cleveland	26
San Antonio, Tex.	108	Cincinnati	26
		Milwaukee	20

shows important central markets and the number of cars consigned to them. Only a selection of the more important ones is given:

It must be remembered, particularly with respect to cities like St. Louis, Missouri, East St. Louis, Illinois, San Antonio, and Taylor, Texas, and other

billing points, that they are used as primary destinations, with a view to subsequent diversion of cars to final consuming markets. It will be seen that the 17 cities listed above were the primary destination of 3,149 cars of the 3,786 cars traced, or 83%.

Why We Import Onions

The exporting of onions from the United States is negligible. Imports are sometimes of considerable importance, particularly in view of freight rates existing at the present time in the United States.

There were times, during 1920 and 1921, when onions could be brought from the Canary Island to New York City at a less cost for transportation than onions could be shipped from Ohio points, and only a little more than the cost of shipping them from the Connecticut Valley and Western New York to the New York market!

Prices during the spring of 1922 in American markets were high enough, in spite of the tariff, to attract onions from surplus production regions in foreign countries. Onions come to the Pacific Coast from Australia, and to the Atlantic Coast from Egypt, South America, West Indies, Mexico, and the Bermudas.

During the first six months of 1922 nearly 700,000 bushels were imported, which is equal to nearly 1,300 carloads. The total imports for the year 1920 were 1,819,000 bushels.

SECTION 5. THE CABBAGE CROP

Cabbage is grown on a commercial scale in at least 25 states. The same distinction with respect to the early and late crop is to be noted as prevails in the case of potatoes and onions.

The commercial production of the country is shown in Figure 8. You will see that, in total production, the states rank as follows:

1.	New York	6.	Florida
2.	Wisconsin	7.	Texas
3.	Pennsylvania	8.	Michigan
4.	Virginia	9.	Ohio
5.	California	10.	New Jersey

Where Early Cabbage Is Grown

The most important states producing for the early market are Florida, California, Texas, Missis-

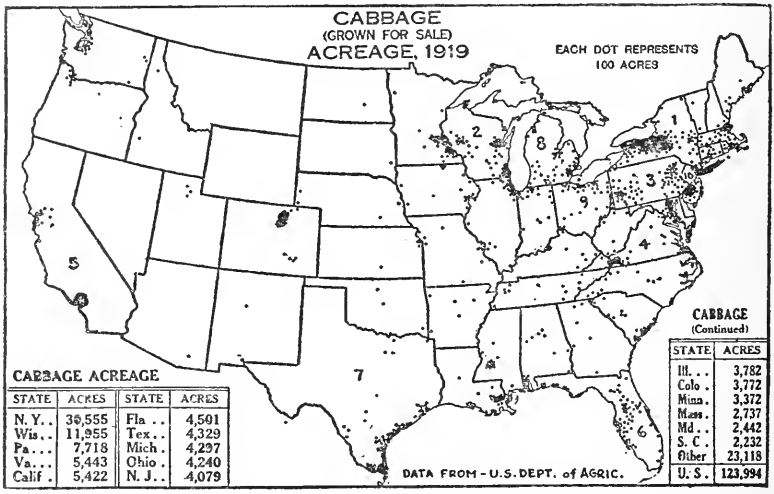


FIGURE 8. CABBAGE PRODUCTION RATHER SCATTERED
While the largest quantities of cabbage are produced in northern states, there are good quantities produced in many southern states. The numbers indicate the order of rank

sippi, Louisiana, and South Carolina. Coleman, Sumter County, and Bartow are the chief Florida shipping points.

Los Angeles, Anaheim, and Fullerton are the most important California shipping points.

Mission, San Benito, Brownsville, and Mercedes are the chief points of origin in Texas.

Crystal Springs and Hazelhurst are in the center of the heaviest production in Mississippi.

Orleans, St. Charles, and St. Tammany parishes make up the most important Louisiana producing territory.

Charleston and Meggetts are the chief shipping points in South Carolina, both being located in Charleston County. The major part of the Charleston shipments originate on Young Island in Charleston harbor.

Where Late Cabbage Is Grown

The late crop should really be divided into medium and late. However, this is not usually done in practice.

The medium late crop is grown in the Norfolk section and in Wythe County, Virginia; in Muscatine County, Iowa; in certain California sections; and in Adams and Weld counties, Colorado. In some of these, late cabbage is also grown.

The important centers of production in eastern Virginia are: Norfolk, Cape Charles, Eastville; and southwest Virginia, Rural Retreat, Marion, Crockett, and Atkins.

Most of the important centers of production in Colorado are: Brighton, the headquarters of the Colorado Cabbage Exchange, Greeley, Lupton, Wattenberg, Ione, Traceyville, and Ault.

By far the most important state in the production of late cabbage is New York. All of the states in the Great Lakes territory are important, but the district south of Lake Erie extending from Syracuse to Buffalo, produces nearly one-fourth of the late cabbage crop of the country. The most important counties are Cortland, Madison, Monroe, Niagara, Onondaga, Ontario, and Wayne. The section around Waterford, Erie County, Pa., may be considered a continuation of the New York territory.

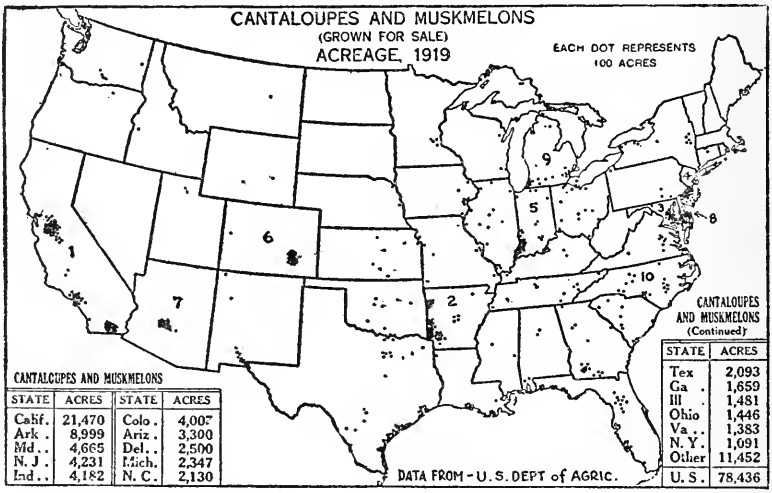
Wisconsin is the heaviest commercial producing state in the middle northwest. The important centers are Cambria, Ripon, Perryville, Somers, Appleton,

Greenville, Shiocton, Corliss, Caledonia, Union Grove, and Racine.

SECTION 6. THE MELON CROP

The commercial crop to which the name "cantaloupe" is applied would more correctly be designated the "muskmelon" crop. Popular usage has, however, decreed otherwise, so that the name of one variety of muskmelon has come to be applied to the whole crop of which it is only a part.

So popular has the cantaloupe grown during the last 15 years that it is now one of the most widely



CANTALOUPES AND MUSKMELONS

STATE	ACRES	STATE	ACRES
Calif.	21,470	Colo.	4,007
Ark.	8,999	Ariz.	3,300
Md.	4,665	Del.	2,500
N. J.	4,231	Mich.	2,347
Ind.	4,182	N. C.	2,130

CANTALOUPES AND MUSKMELONS (Continued)

STATE	ACRES
Tex	2,093
Ga.	1,659
Ill.	1,481
Ohio	1,446
Va.	1,383
N. Y.	1,091
Other	11,452
U. S.	78,436

FIGURE 9. WHERE CANTALOUPES ARE GROWN

Cantaloupes are now commonly shipped entirely across the country, as you will see by the important places held by California, Colorado and Arizona

used, thoroughly distributed, and seasonably available articles of food in the United States.

Where Cantaloupes Are Grown

Fresh cantaloupes in commercial quantities become available from the Imperial Valley of California, during the latter part of May, and continue on our markets until well into October, the last

important shipping territory being the region of relatively higher altitude, around Rocky Ford, Colorado.

Figure 9 shows the location of the most important commercial producing areas.

Rank of States In Cantaloupe Production

In 1919 the order of rank in cantaloupe production was as follows:

1.	California	6.	Colorado
2.	Arkansas	7.	Arizona
3.	Maryland	8.	Delaware
4.	New Jersey	9.	Michigan
5.	Indiana	10.	North Carolina

California is the most important cantaloupe state in point of acreage and quantity of production. The chief centers are the Imperial Valley in the south, with Brawley, Heber, and Calexico the chief shipping points; Los Angeles County and Stanislaus County, with Turlock, Keyes, and Demair the most important shipping stations.

In point of acreage, the state of Arkansas ranks next to California, but the production per acre is very much less. Harris, Blevins, McCaskill, Nashville, and Van Buren are among the more important shipping points.

An important territory is in the Salt River Valley near Glendale and Phoenix, Arizona. This territory usually ships from 900 to 1,500 cars between June 25 and August 5.

The cantaloupe territory on the New Mexico-Texas line is in the Messila Valley, the chief center being La Tuna.

The heavy shipping district in Colorado is the Rocky Ford-Ordway section in Arkansas Valley.

The important producing territory in Indiana is in the counties of Gibson, Jackson, Knox, and Posey. The heavy shipping points are Vincennes,

Decker, Poseyville, and Johnson. The headquarters of the distributing agencies are mostly located in the town of Princeton.

The heavy producing territory in Georgia is in the vicinity of Fitzgerald, Valdosta, and Camilla.

Sussex County, Delaware, Gloucester County, New Jersey, and Wicomico County on the eastern shore of Maryland are also important producing sections.

Rapid Growth of the Cantaloupe Industry

As an illustration of the rapid increase of the cantaloupe industry, the Imperial Valley furnishes an important instance. In 1905 only 297 carloads were shipped from this section. Since that time, the volume has increased more than 3,000%! The season of 1922 was the greatest that has ever been experienced when to July 20, 12,056 cars had been shipped as compared with 10,708 in 1921, and 8,903 in 1920.

The average yield is from 150 to 160 standard crates, but many fields will run 200 crates to the acre.

Enormous Shipments in 1922

The largest number of cars ever shipped on one day in any previous season was in June, 1919, when 348 went out in a single day. On June 9, 1921, 335 cars were shipped. In 1922 all previous records were broken when on June 19, 385 cars were shipped. The movement continued to grow and by the 23d, 525 cars rolled; on the 26th, 557; and on the peak day of the season, June 27, 648 cars were loaded. This was just 300 cars higher than the record day of previous years.

During the last 10 days in June, an average of more than 500 cars rolled daily, while for the three weeks' period, June 17 to July 4, the daily loadings exceeded 300 cars per day, except on two Sundays.

This crop was marketed by 43 distributers, only two of whom shipped less than 100 cars. The largest individual distributer shipped 950 cars.

When you bear in mind that this crop is produced 3,000 miles away from its greatest single market, New York City, is highly perishable, and must be shipped in refrigerator cars practically on passenger train schedules, you can readily visualize the multitude, peculiarity, and difficulty of the marketing problems that arise.

In 1917 cantaloupe shipments totalled 16,719 cars from all shipping sections of the United States. In 1922 the shipped crop totalled nearly 30,000 cars.

THE WATERMELON CROP

One of the remarkable occurrences of recent years in American dietary, is the rate at which consumption of fruits and vegetables has increased and consumption of meat has decreased. Watermelons have increased in use along with the rest.

Where Watermelons Are Grown

The 1920 crop of nearly 40,000 cars was nearly 10,000 carloads greater than the 1919 crop. Comparable figures are not available for all years, but it is interesting to note that the 1921 crop totaled 46,463 cars. In 1922, the shipments reached 48,000 cars.

In 1922 Georgia shipped a total of 13,098 cars; Florida, 10,897 cars; South Carolina, 4,524 cars; and Texas, 3,630 cars. California is usually a heavy shipping state and its 1922 total was around 4,000 cars.

The southeastern states in 1922 contributed 26,342 cars during the period from May 23 to August 7. This quantity was produced in Florida, Georgia, South Carolina, North Carolina, and Alabama. Of the 26,342 cars, 7% went to New England, 34% to the Middle Atlantic States, over 25% to the Middle West, 6% to the states west of the Mississippi, and 27% to the Southern States. New York City alone received 30,044 cars, or 11.6%, and Chicago, 1,737 cars, or 6.6%.

When Watermelons Are Marketed

Without attempting to discuss further the location, importance, and shipping seasons of the main watermelon area, Table XI is given to indicate to the student, the widespread character of the watermelon industry and the relative importance of the different areas. The tonnage for 1917 is given as that is the year for which the most complete relative figures are available.

Table XI. Watermelon Shipping Areas, 1917

State	No. Cars	Shipping Season	Larger Loading Stations
Georgia	8,770	June 1- Sept. 15	Thomasville, Quitman, Ft. Valley
South Carolina	4,107	June 20- August 31	Lena, Furman, Ridgeland
Florida	3,622	May 1- August 15	Bowling Green Ocala, Live Oak
Texas	2,871	May 15- Oct. 15	Hemstead, Weatherford, Como
Missouri	2,533	July 15- Oct. 1	Malden, Gibson, Clarkton
Alabama	1,552	June 15- Oct. 15	Grand Bay, Malvern
North Carolina	1,201	July 15- Sept. 1	Laurinburg, Fayetteville, Maxton
California	1,137	June 1- Oct. 10	Brawley, Dinuba, Turlock
Maryland	1,019	Aug. 1- Oct. 1	Salisbury, Reid's Grove
All Other States	3,612		
Total	30,424		

SECTION 7. THE FUTURE DEVELOPMENT

The commercial fruit and vegetable industry has developed in such a short time that it has not received the attention that has been devoted to some other classes of agricultural commodities.

Fresh fruits and vegetables, furthermore, are seasonal crops. They must be sold while in prime condition or loss occurs. Some crops of this class, such as strawberries and lettuce, must be marketed immediately after harvesting. Others, like potatoes and apples, may be stored several months without serious deterioration. This complicates the marketing problem.

In addition, the production of fruits and vegetables is subject to greater fluctuation than is the case with most other commodities. An acre of good wheat land will produce only about 30 bushels, or 1,200 pounds. It will take a great many additional acres to have an appreciable effect on the crop of a nation that runs into 600 or 800 million bushels.

Cabbages, on the other hand, often yield 10 tons (20,000 pounds) to the acre, and a comparatively small increase in acreage, may push supply far above the demand with disastrous results to prices.

Production Close to Consuming Capacity

At the present time, the production of many classes of fruits and vegetables is perilously near the present consuming capacity of the country. We have thousands of acres of land in various sections of the country that are admirably adapted to the production of fruits and vegetables, but until methods of marketing the existing crops are improved, or the consuming capacity of the country is increased, it would be folly to think of developing them.

How Citrus Growers Avoided Over-Production

Much has been done to improve the situation, but still more remains to be accomplished. Twenty years

ago, the citrus growers of California were confronted by the problem of over-production. Conditions had seemed to favor the orange and lemon industry for a number of years. Prices were good and the growers increased the size of the groves and many new growers entered this attractive industry.

Then suddenly, something went wrong. Prices began to decline in the favorite markets, so that, frequently, a carload of oranges would sell for less than the cost of production. There seemed to be more oranges than the people could consume.

Then followed some wild efforts to find new markets. Cars were diverted from the glutted markets to other points, but this afforded very uncertain relief, because when one large grower diverted a carload from New York to Baltimore, the chances were that his neighbor and a number of other growers would do the same thing. So that by the time half of the cars arrived in Baltimore, prices would be demoralized there also.

How Organization Is Increasing Demand

Something had to be done, and a number of the leading citrus growers got together and organized the California Fruit Growers' Exchange. This is a producers' organization developed for the purpose of enabling the growers to work out cooperatively the problems that none could solve individually. This organization has been extremely successful. Like any other similar effort, it has had its ups and downs, but through persistence and wise direction it has always managed to maintain a very large and representative membership.

It would be difficult to estimate the good that it has accomplished for the citrus growers of California, and incidentally, for those of Florida as well.

The Exchange, first of all, tackled the problem of distribution. It regulated the shipments to the

various markets. Having control of a large part of the total crop, this could be done effectively. It then undertook to improve the methods of growing, harvesting, and packing.

Last, but not least, it inaugurated a very effective system for stimulating the consumption of citrus fruits by educating the public through advertising. This has been so very effective that the consumption of oranges and lemons has steadily increased with gratifying results to all concerned.

Some Growers Saved by Cooperation

Following similar methods, the California Associated Raisin Growers rescued a large group of grape producers who were on the verge of destitution, and placed their industry upon a very sound and profitable foundation. Many other successful cooperative organizations have been developed recently in California, and to a limited extent in other parts of the country.

An important development which has been peculiar to the fruit and vegetable industry has been the organization of large private or semi-cooperative selling agencies. Among the large outstanding ones, have been the North American Fruit Exchange, the General Sales Agency, and the American Fruit Growers, Inc. These sales agencies are treated fully in succeeding lessons.

One of the big difficulties in marketing fruits and vegetables has been that even though a community might cooperate in shipping, it would not have sufficient tonnage, or a sufficiently long season to warrant maintaining its own sales force in the large markets. The California Fruit Growers' Exchange, however, has been able to maintain sales organizations in principal markets, because it has oranges and lemons moving to market every month in the year.

The private sales agencies were developed to meet this need for representatives in large markets. They have their representatives in all of the important markets, and are able to maintain this force, because they handle shipments from various growers or cooperative associations in different parts of the country, some of which are shipping each month in the year.

Selling by Auction May Increase

Another phase of fruit and vegetable marketing is thought by certain students of marketing to have great potential possibilities. This is the auction method of selling, which will be covered thoroughly in a separate lesson. The fruit auctions play an important part in the perishable business in most large markets, but with a few notable exceptions, it is true that auctions have been used mostly to dispose of shipments which could not be sold through the usual trade channels.

Consequently, in many cities auctions have become the last resort for fruit which has been shipped from one market to another, and which has reached the point where it must be sold without further delay. The California Fruit Growers' Exchange sells the larger part of its fruit through auctions and has apparently profited by it.

Students who feel that there will be a real development in this method of selling in the future, base their arguments mainly upon these two points:

First, the development of standardization will greatly facilitate auction selling.

Second, fruit auctions seem to be the nearest approach to the centralized exchange system which has been so effective in selling live stock, grain, and cotton.

There is a greater opportunity for waste and loss in the fruit and vegetable industry than in almost any other departments of agriculture. Ignor-

ance of proper marketing methods, the perishable nature of the crops, and the lack of organized selling machinery are the reasons.

Why By-Products Reduce Losses

The development of the by-product industry has done much to reduce unnecessary waste and losses by making profitable use of fruits and vegetables that cannot be marketed profitably otherwise. The canning and drying of fruits and vegetables, and the making of fruit juices have all helped to prevent loss of surplus or cull products.

While much has been done in the development of the by-product industry, the limit of possibilities in this direction is not in sight, and tremendous developments may be looked for in the next few years. This subject is treated at much greater length in later lessons.

Section 8. PUBLICITY FOR FRUITS AND VEGETABLES

One of the principal problems that the fruit and vegetable grower has to overcome in the marketing of his product, is the tendency on the part of the general public to regard certain of these commodities as luxuries. Much has been done to remove this notion from the public mind, but a great deal still remains to be accomplished. This question is of particular importance to the producers of what are commonly regarded as out-of-season crops.

Why Winter Use of Lettuce Increased

Lettuce is one of these. Previously regarded as a very great luxury in the winter time, its use was confined to the wealthy class whose requirements were largely filled by local greenhouses.

In 1899, the state of California produced only two acres of lettuce. However, the public's appetite for lettuce was being coaxed along by Florida growers, who planted 548 acres in 1899. By 1919, the lettuce acreage in California had increased to 6,121, and in Florida to 2,664.

The increase in consumption, indicated by these figures, has been accomplished without any real concentrated effort on the part of the producers or distributers. If the producers of lettuce could pool their efforts just as the raisin and the walnut growers of California have done, and if they would conduct an educational campaign, the demand for this very healthful and palatable winter vegetable could doubtless be doubled or tripled very quickly.

This is cited as an example of the possibilities of cooperative effort on the part of producers to increase the demand for a commodity that is in danger of being produced in larger quantities than can be sold to advantage, unless demand is increased.

How Advertising Made Citrus Fruits Necessities

Advertising, in one form or another, has accomplished the seemingly impossible task of removing citrus fruits from the strictly luxury class, so that they are now considered an absolute necessity by a large portion of the population.

A greater opportunity for the application of modern selling methods is given in the advertising of fruits and vegetables than in any other agricultural commodity. This statement is made for several reasons:

First, because fruits and vegetables generally go to the consumer in the original form.

Second, because the distribution and sales of fruits and vegetables are probably less organized than any of the main classes of agricultural products. Grain, live stock, and cotton already have their organized central market places.

Third, fruits, especially have, until recently, been considered more in the class with luxuries and it is only in the past few years that they have been generally recognized as an essential part of our everyday diet. The educational work of the raisin growers with the slogan "Have you had your iron today?" is especially noteworthy.

Much Still Remains to Be Accomplished

One fact must be borne in mind, and that is, that in spite of the noteworthy progress that has already been made in the marketing of the fruit and vegetable crops, much still remains to be accomplished. The industry, as a whole, is unorganized. Even the marketing of our most important fruit crop, apples, is in a chactic state in many localities, and very little has been done in the way of a consistent effort to stimulate greater use of this crop.

The Federal Bureau of Markets since its organization in 1913, has greatly assisted the fruit and vegetable industry. Its work on standard grades, inspection, and market news service, has done much to bring the industry out of chaos and to put it on a more substantial footing.

The fruit and vegetable industry will always be speculative, because of the perishable nature of the crops, but standard grades, inspection, and the widespread knowledge of marketing conditions can do much to reduce the extent of gambling and render it essentially a well-organized, legitimate business.

THE ONE MOST IMPORTANT SERVICE IN RAISING PRICES

Possibly it is over-stating the matter a little to say that any one factor in the marketing of fruits and vegetables influences prices more than others. But it is generally recognized that the subject discussed in Lesson 2, is the one that has been largely responsible for the better prices and the better demand enjoyed by fruits and vegetables in recent years.

What is it that any shipper can do to greatly reduce his freight bills?

What is it that makes auction selling possible?

What is it that has made housewives willing to pay more for fruits than in former years?

What is it that has made it possible to sell more oranges since growers organized themselves into co-operative shipping associations?

The answers are made very clear in Lesson 2, and after reading it, there will be no doubt in your mind but that it pays shippers to do this work that makes consumers more willing to pay higher prices for good quality fruits and vegetables.

GLOSSARY OF MARKETING TERMS USED IN THIS LESSON

brassica, n. A large genus of annual and perennial herbs of the mustard family of the old world, furnishing several of the earliest cultivated and most valuable table vegetables such as cabbage, cauliflower, kale, brussels sprouts, etc.

by-product, n. After the best of a lot of fruits or vegetables is sold for the use to which they are best suited, there usually are some of inferior grade that are canned, made into preserves, jellies, drinks, or other useful products known as by-products.

citrus fruit, A fruit borne on trees that do not shed their leaves each season; as opposed to deciduous fruits (which see). The genus includes: oranges, lemons, limes, grape fruits, tangerines, etc.

cucurbitous crop, A crop belonging to the cucurbitacae, a genus of herbaceous vines of the gourd family, including pumpkins, squashes, watermelons, cucumbers, etc.

cull, n. An article rejected, or at least placed in an inferior grade. For example, in sorting potatoes, those which are scabby or knotty are thrown out as culls. Sometimes culls have a value. For example: cull potatoes may be used for stock feed. In other cases, culls have little value, or at least no use has yet been discovered for them.

deciduous fruit, Fruit borne on trees that shed their leaves at the close of each producing season, such as apples, pears, plums, peaches, apricots, and others.

divert, v. As used in this lesson, to change the destination of a shipment. Usually only full carloads are diverted.

demoralized price, A low price brought about by a supply greater than the demand. As a rule, a demoralized price is one which does not return shippers a profit. Sometimes the returns are not enough to pay the freight alone.

express shipment, A shipment made through an express company instead of through the railroad company, usually of a small quantity (less than a carload). The shipment usually is made by express in order to decrease the time between the shipping point and the market. There are times when entire carloads are shipped by express, in which case the car is handled the same as an express car, on an express train.

glut, v. A condition that sometimes occurs in a market, characterized by the presence of more of a certain product than can be sold at a price fair to producers before more of the product will arrive for sale.

market news service, A system maintained by the Federal Department of Agriculture, whereby information regarding prices, demand, and supply of fruits and vegetables, is transmitted by telegraph, radio, telephone, and mail, to shipping points, from which the products reported on are to be shipped.

perennial plant, One that continues to grow from one planting, from year to year, as opposed to an annual plant, which is one that must be planted each year. A biennial plant is one that lives for two years from the one planting.

solanaceous crop, Crops belonging to the solanaceae family, a large genus of temperate and tropical herbs, shrubs, and trees. In North America the best known crops of this genus belong to the so-called "night shade" family, and include tomatoes, potatoes and egg-plant.

salad plant, Plants commonly used for making salads, including lettuce, endive, chickory, dandelion, garden-cress, mustard, cives, etc.

tuber crop, A crop cultivated for the tubers or enlarged roots which are used for food for either man or beast.

tonnage, n. As used in this lesson, refers to a total number of tons; often used in an indefinite capacity, that is, without referring to a specific number of tons. Instead of saying, "The total quantity of fruits marketed this year is extra large," the same thing is often said by using the word "tonnage," thus: "The tonnage of fruits marketed this year is extra large."

urban, adj. Descriptive of persons or things, in, or related to a city or town; as opposed to country.

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